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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,143	04/27/2005	Seiji Sugiura	TOW-099US	5048
959 7590 05/28/2008 LAHIVE & COCKFIELD, LLP ONE POST OFFICE SQUARE BOSTON, MA 02109-2127				
EXAMINER				
HAN, KWANG S				
ART UNIT		PAPER NUMBER		
4132				
MAIL DATE		DELIVERY MODE		
05/28/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/533,143

Applicant(s)

SUGIURA ET AL.

Examiner

Kwang Han

Art Unit

4132

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/02)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____
- Paper No(s)/Mail Date 4/27/05 and 3/27/08

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement filed 4/27/2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred, references A6-A9 and A11, therein has not been considered.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "said coolant supply passage" in the fuel cell of claim 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (US 2001/0044042, as cited in IDS) in view of Sha et al. (JP 2000-164230, as cited in IDS, refer to machine translation).

Inoue et al is directed to a fuel cell comprised of the following:

- a electrolyte electrode assembly (12) and separators (16) stacked alternately (Figure 1; [33]),
- the electrolyte electrode assembly including a pair of electrodes (20, 22),
- an electrolyte interposed between the electrodes (18),
- a reactant gas passage (36a, 38a) and a reactant gas discharge passage (36b, 38b) extending through the fuel cell in the stacking direction (Figure 1),

- a reactant gas flow field (60, 62) formed for supplying a reactant gas along an electrode surface (Figure 2; [43]),
- the reactant gas flow field including a plurality of serpentine flow grooves having substantially the same length (Figure 3, 4), and
- the flow grooves having an even number of turn regions (Figure 3, 4).

Inoue is silent towards the use of substantially triangular inlet or outlet buffers which are symmetric.

Sha et al. teaches the use of triangular buffers at the inlet and outlet regions of the flow grooves and reactant gas supply passage for the benefit of minimizing stagnation of fluids, allow for more uniform distribution of fluids, and minimizing contact resistance [48, 49] (Figure 1, 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Sha's triangular buffers in Inoue's fuel cell for the benefit of a more uniform distribution of gases and minimizing contact resistance.

Regarding claim 2, Sha teaches the use of a plurality of bosses (11a) formed in both the inlet buffer (11) and outlet buffer (12) (Drawing 1).

Regarding claim 4, Sha teaches a fuel cell where one side of the inlet buffer and one side of the outlet buffer are substantially perpendicular to the terminal portions of the serpentine flow grooves (Drawing 1).

Regarding claim 5, Inoue is further directed to a fuel cell comprised of the following:

- a fuel gas supply passage (36a),

- an oxygen containing gas supply passage (38a),
- a fuel gas discharge passage (36b),
- an oxygen-containing gas discharge passage (38b),
- a coolant supply passage (40a),
- a coolant discharge passage (40b), and
- these passages are divided evenly (Figure 5), wherein three passages extend on the left end of the separator and three on the right [50].

Regarding claim 6, the teachings of Inoue and Sha as discussed are herein incorporated. Inoue is further directed to a fuel cell wherein a gas flow field (60) is formed on one surface (16a) and a coolant flow field (72a, 72b) is formed on the other surface (16b) of the separator (Figures 2, 5; [42, 44]). Inoue is silent towards the use of a triangular buffer as discussed in claim 1.

Sha et al. teaches the use of triangular buffers at the inlet and outlet regions of the flow grooves and reactant gas supply passage for the benefit of minimizing stagnation of fluids, allow for more uniform distribution of fluids, and minimizing contact resistance [48, 49] (Figure 1, 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Sha's triangular buffers in Inoue's fuel cell's gas/coolant supply passages and the flow fields for the benefit of a more uniform distribution of gases and fluids.

Regarding claim 7, Inoue teaches a fuel cell wherein the reactant flow field (60, 62) includes a flow groove having a curve (Figure 4 and 5, as the channels turn at the bends).

Regarding claim 10, the applicant is directed towards the discussion concerning claim 4.

Regarding claim 11, the applicant is directed towards the discussion concerning claims 5 and 6.

8. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. and Sha et al. as applied to claim 1 and 6 above, and further in view of Schora et al. (US 5077148).

Regarding claims 3 and 9, the teachings of Inoue and Sha as discussed above are herein incorporated. Inoue and Sha are silent towards the use of a gas supply and discharge passage which has at least one oblique side.

Schora teaches the use of gas passages (24, 25) for both the supply and discharge (Column 9, Lines 15-19) that has a triangular shape having at least one oblique side for the benefit of easily formed wet seal area (Column 9, Lines 25-29).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Schora's gas passage in Inoue and Sha's fuel cell for the benefit of providing a gas passage which can more easily form a wet seal area.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. and Sha et al. as applied to claim 6 above further in view of Kurita et al. (JP10106594, as cited in IDS).

Regarding claim 8, the teachings of Inoue and Sha as discussed above are herein incorporated. Sha teaches the use of a triangular buffer but is silent towards the use of a substantially rectangular buffer. Inoue teaches stacking of fuel cell units to form a fuel cell stack with opposing separators/metal plates [33].

Kurita teaches the use of plates between fuel cell unit cells that include a substantially rectangular buffer for the benefit of improving the gas passage in a plate between unit cells to enhance gas efficiency (Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Kurita's plates between the fuel cell unit cells with a rectangular buffer region in Inoue and Sha's fuel cell for the benefit of improving the gas passage between the unit cells.

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./
Examiner, Art Unit 4132

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 4132